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Peter William McOwan

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EXAMINER

PARK, EDWARD

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/500,854	<b>Applicant(s)</b> MCOWAN ET AL.	
	<b>Examiner</b> EDWARD PARK	<b>Art Unit</b> 2624	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 16 February 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-57 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-57 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2/16/10</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. This action is responsive to applicant's amendment and remarks received on 2/16/10. Claims 1-57 are currently pending.

### ***Response to Arguments***

2. Applicant's arguments filed on 2/16/10, in regards to claim 1, have been fully considered but they are not persuasive. Applicant argues that the cited prior art references do not teach normalizing .... produce the signature to 1 (see pg. 17, fourth paragraph - pg. 18, first paragraph). This argument is not considered persuasive since Geiger teaches the cited limitation within paragraphs [0020], [0054], [0080]; [0062] where respective segment is normalized to be comparable with the previously stored extensions; handwriting recognition system subjects the received coordinates to a normalization technique, such as Gaussian Smoothing process (step 220). Thereafter, in step 225 (which is substantially similar to step 130 of FIG. 2), the handwriting recognition system of the present invention can determine curvature information of each point on the stroke contour or segment of the input data using the normalized or smoothed coordinates; normalize an input feature link to form a normalized input (I) so as to have the standard cross length and the standard number N of data points by local level filtering; handwriting speed is slower in a particular interval, it would likely contain more points in such interval. It follows that when the writing speed is faster, the interval would likely possess sparser

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distribution of the points. A conventional technique for executing such filtering procedure is called "equidistant re-sampling" procedure, which forces a minimum Euclidean distance between two data points. The results of this prior art procedure likely provides approximately equidistant data points. In the fast handwriting interval, there may be a smaller number of data points, and an interpolation technique may be used to fill the gaps between these points. Examiner notes that the signature data is both normalized in length and time as seen within the quoted sections (stroke contour or segment is normalized or smoothed coordinates; filtering which is dependent on handwriting speed and re-samples using Euclidean distance). Examiner notes that the cited limitation also has 112 issues that can be seen below along with the rejection of claim 1.

Applicant argues that the Plamondon and Hu can not be combined due to an unsatisfactory intended purposes and the combination would change the principle of operation (see pg. 18, section b). In response to applicant's argument that there is no teaching, suggestion, or motivation to combine the references, the examiner recognizes that obviousness may be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988), *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992), and *KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007). In this case, it would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon with Geiger combination to utilize the normalization means for the signature trace as suggested by Hu, to "remove the effects of translation, rotation, and scale change from the signature" (see col. 5, lines 50-65) in order for

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matching/comparing through biometric authentication. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Regarding claims 17, 33, 38, 43, 48, 55, applicant argues that the claims are allowable due to the same reasons as stated within claim 1 (see pg. 19, first paragraph). This argument is not considered persuasive since claim 1 stands rejected and the arguments and rejections are recited within this correspondence.

Regarding claims 2-16, 18-32, 34-37, 39-42, 44-47, 49-55, applicant argues that the claims are allowable due to the dependency and the same reasons as listed within the corresponding independent claims (see pg. 19, second-third paragraph). This argument is not considered persuasive since all independent claims stand rejection and the arguments and rejections are recited within this correspondence.

### ***Claim Rejections - 35 USC § 112***

3. Applicant argues that the cited limitation within claims 1, 17, 33, 38, 43, 48, 55, is deemed clear and definite (see pg. 16, second - fourth paragraph). This argument is not considered persuasive since applicant argues that the term normalizing .. to an arc length of 1 and a total time to produce the signature to 1 is well known in the art, but as the claim reads in the light of the specification, there is too much ambiguity within the cited section. If the applicant is

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reading the claim language as normalizing to a unit measurement or another equivalent definition for the cited limitation; examiner advises that the applicant delete the normalizing an arc length of 1 and total time to 1 and replace with phrases similar to unit measurement. Therefore, examiner acknowledges the applicant's argument but does not retract the 112 rejection, since the claim as it stands is too ambiguous; and applicant is advised to amend the claim as argued within the remarks/argument section.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**Claims 1, 17, 33, 38, 43, 48, 55** rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim calls for the element, “normalizing the signature trace to an arc length of 1 and a total time to produce the signature to 1”. The element, “normalizing ... an arc length of the signature trace to 1 and ... total time ... to 1”, is unclear and deems the claim indefinite. The scope of protection is unclear since what is an arc length based off of a signature trace that is normalized to 1? Is the arc length to be transformed to a constant 1? Does 1 have a unit? Is the normalization to 1 in order to produce a single continuous trace? Is the total time to produce the signature to 1 equivalent to the time it takes to normalize a set of points? Does the total time to produce the signature equal to 1 second? Does 1 have a unit? The examiner will interpret the newly added amendment as reasonably broad as possible. Therefore, the examiner will interpret the cited limitation added by the applicant as equivalent to normalizing the signature trace to an arc length and normalizing a total time to produce the

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signature and will give no weight to the latter portion of the cited limitation, due to the ambiguity of the claim. Correction is required.

### ***Claim Rejections - 35 USC § 101***

4. Applicant argues that claims 17-37, 48-55 incorporate a manual input device which creates a tie to a statutory class, a machine (see pg. 17, first - second paragraph). This argument is not considered persuasive since a manual input device is tied to the extraction portion of the angle and distance data of the signature. Therefore, the input device is not tied to the basic inventive concept of the application, rather the pre-processing steps. Therefore, the 101 rejection remains as seen below. Examiner advises applicant to amend and insert “a processor or computing device performing the steps of:” within the very beginning of the preamble or within the inventive step(s).

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

**Claims 17-37, 48-55** are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. The Federal Circuit<sup>1</sup>, relying upon Supreme Court precedent<sup>2</sup>, has indicated that a statutory “process” under 35 U.S.C. 101 must (1) be tied to a particular machine or apparatus, or (2) transform a particular article to a different state or thing.

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<sup>1</sup> *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

<sup>2</sup> *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876).

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This is referred to as the “machine or transformation test”, whereby the recitation of a particular machine or transformation of an article must impose meaningful limits on the claim's scope to impart patent-eligibility (See *Benson*, 409 U.S. at 71-72), and the involvement of the machine or transformation in the claimed process must not merely be insignificant extra-solution activity (See *Flook*, 437 U.S. at 590”). While the instant claim(s) recite a series of steps or acts to be performed, the claim(s) neither transform an article nor are positively tied to a particular machine that accomplishes the claimed method steps, and therefore do not qualify as a statutory process.

That is, the method includes steps of comparing, providing, receiving, extracting, etc. is of sufficient breadth that it would be reasonably interpreted as a series of steps completely performed mentally, verbally, or without a machine. The cited claims do not positively recite any structure within the body of the claim which ties the claim to a statutory category.

Furthermore, the examiner suggests that the structure needs to tie in the basic inventive concept of the application to a statutory category. Structure that ties insignificant pre or post solution activity to a statutory category is not sufficient in overcoming the 101 issue. Additionally, the limitations do not claim data that represents a physical object or substance, the data representing the physical object is not present and therefore can not be modified by the process in a meaningful or significant manner, and no meaningful and significant external, non-data depiction of a physical object or substance is produced. Thus, the limitations do not satisfy the transformation test.

<sup>1</sup> *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

<sup>2</sup> *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claims 1-7, 15-23, 31-48, 51, 55, 56, 57** are rejected under 35 U.S.C. 103(a) as being unpatentable over by Plamondon (US 5,101,437) with Geiger et al (US 2006/0050962 A1), and further in view of Hu et al (US 6,157,731).

Regarding **claim 1 (as best understood)**, Plamondon teaches an authentication system for authenticating a user's signature the system comprising:

a first extraction means for extracting angle and distance data relating to different parts of the user's signature inputted into the system by the manual input device to obtain a signature trace (Plamondon: col. 12, lines 1-9; col. 1, lines 44-67);

registration means for setting up a reference data file comprising from reference angle data and reference distance data extracted from a plurality of samples of the user's signature (Plamondon: col. 6, lines 63-68);

comparison means for comparing the data extracted by the second extraction means during an authentication phase to the reference angle data and the reference distance data held in the reference data file, according to defined verification criteria (Plamondon: col. 12, lines 64-68; col. 13, lines 1-15); and

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verification means for providing an output indicative of an appropriate match between the user's signature and the reference angle data and reference distance data in dependence on the result of the comparison (Plamondon: figures 1a,1b). Plamondon does not disclose normalization means generating a normalized signature trace by determining a plurality of temporally equidistant points on the signature trace by normalizing the signature trace to an arc length of 1 and a total time to produce the signature to 1; and a second extract means for extracting data relating to different parts of the normalized signature trace.

Geiger, in the same field of endeavor, teaches normalization means generating a normalized signature trace by determining a plurality of temporally equidistant points on the signature trace by normalizing the signature trace to an arc length of 1 and a total time to produce the signature to 1 (see paragraphs [0020], [0054], [0080]; [0062]; respective segment is normalized to be comparable with the previously stored extensions; handwriting recognition system subjects the received coordinates to a normalization technique, such as Gaussian Smoothing process (step 220). Thereafter, in step 225 (which is substantially similar to step 130 of FIG. 2), the handwriting recognition system of the present invention can determine curvature information of each point on the stroke contour or segment of the input data using the normalized or smoothed coordinates; normalize an input feature link to form a normalized input (I) so as to have the standard cross length and the standard number N of data points by local level filtering; handwriting speed is slower in a particular interval, it would likely contain more points in such interval. It follows that when the writing speed is faster, the interval would likely possess sparser distribution of the points. A conventional technique for executing such filtering procedure is called "equidistant re-sampling" procedure, which forces a minimum Euclidean distance between

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two data points. The results of this prior art procedure likely provides approximately equidistant data points. In the fast handwriting interval, there may be a smaller number of data points, and an interpolation technique may be used to fill the gaps between these points).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon reference to utilize the normalization means for the signature trace as suggested by Geiger, to duplicate handwritten data points and to suppress various noises and reduce the variability in the raw handwritten data (see paragraphs [0054], [0062]).

Hu, in the same field of endeavor, teaches second extract means for extracting data relating to different parts of the normalized signature trace (see col. 4, lines 53-67; col. 5, lines 1-12; global features may include path-tangent angle of pen motion, rms speed, length-to-width ratio, etc.).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon with Geiger combination to utilize the normalization means for the signature trace as suggested by Hu, to "remove the effects of translation, rotation, and scale change from the signature" (see col. 5, lines 50-65) in order for matching/comparing through biometric authentication.

Regarding **claim 2**, Plamondon discloses to extract data relating to a plurality of different points of the user's signature including data relating some of said points to other points in the user's signature as inputted into the system by the manual input device (Plamondon: figures 8-11; col. 7, line 49 – col. 8, line 55).

Regarding **claim 3**, Plamondon discloses to extract data relating to a plurality of different points of the user's signature including data relating each of a number of said points to an

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immediately preceding point in the user's signature as inputted into the system by the manual input device (Plamondon: figures 8-11; col. 7, line 49 – col. 8, line 55).

Regarding **claim 4**, Plamondon discloses to extract data relating to a plurality of different points of the user's signature including data relating a last point to a first point in the user's signature as inputted into the system by the manual input device (Plamondon: figures 8-11; col. 7, line 49 – col. 8, line 55).

Regarding **claim 5**, Plamondon discloses an angle extract means for extracting angle data concerning the relative angular positions of a plurality of points of the user's signature (Plamondon: col. 7, line 49 – col. 8, line 55).

Regarding **claim 6**, Plamondon discloses a distance extract means for extracting distance data concerning the relative distances apart of a plurality of points of the user's signature (Plamondon: figures 8-11; col. 7, line 49 – col. 8, line 55).

Regarding **claim 7**, Plamondon discloses timing extract means for extracting timing data indicative of the relative times between execution of different parts of the user's signature, and the comparison means is adapted to compare the extracted timing data with reference timing data in the reference data file (Plamondon: figures 8-11; col. 7, line 49 – col. 8, line 55).

Regarding **claim 15**, Plamondon discloses a training means for training the system to refine the verification criteria by which a match is to be judged on the basis of angle and distance data relating to a plurality of samples of the user's signature inputted into the system by the user during the registration phase and generated false samples (Plamondon: col. 20, line 59 – col. 21, lines 67; to determine the personalize threshold values more than one reference signatures are acquired, and compared among themselves taken two by two, to obtain several groups of RC1,

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RC2 ... to this effect the apparatus further comprises means for comparing each of said Rc1 Rc2 ... with other corresponding value of its own group, and determining maximum value of each group which constitutes respectively personalized threshold values Sp1, Sp2 ...).

Regarding **claim 16**, Plamondon discloses a reject output indicative of non-matching of one or more verification criteria only after completion of all the verification procedures (Plamondon: figure 21; col. 21, lines 28-67).

Regarding **claim 17 (as best understood)**, Plamondon discloses a method for authenticating a user's signature, comprising:

- extracting angle data and distance data relating to different parts of the user's signature inputted into the system by a manual input device to obtain a signature trace (Plamondon: col. 12, lines 1-9; col. 1, lines 44-67);
- creating a reference data file comprising reference angle data and reference distance data extracted from a plurality of samples of the user's signature inputted into the system by the user using a manual input device during a registration phase (Plamondon: col. 6, lines 63-68);
- comparing the data relating to different parts of the normalized signature trace during an authentication phase to the reference angle and the reference distance data held in the reference data file, according to defined verification criteria (Plamondon: col. 12, lines 64-68; col. 13, lines 1-15); and
- providing an output indicative of an appropriate match between the user's signature and the reference angle data and reference distance data in dependence on the result of the comparison (Plamondon: figures 1a,1b). Plamondon does not disclose normalizing the signature trace to generate a plurality of temporally equidistant points on the signature trace by normalizing the

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signature trace to an arc length of 1 and a total time to produce the signature to 1; and extracting data relating to different parts of the normalized signature trace.

Geiger, in the same field of endeavor, teaches normalizing the signature trace to generate a plurality of temporally equidistant points on the signature trace by normalizing the signature trace to an arc length of 1 and a total time to produce the signature to 1 (see paragraphs [0020], [0054], [0080]; [0062]; respective segment is normalized to be comparable with the previously stored extensions; handwriting recognition system subjects the received coordinates to a normalization technique, such as Gaussian Smoothing process (step 220). Thereafter, in step 225 (which is substantially similar to step 130 of FIG. 2), the handwriting recognition system of the present invention can determine curvature information of each point on the stroke contour or segment of the input data using the normalized or smoothed coordinates; normalize an input feature link to form a normalized input (I) so as to have the standard cross length and the standard number N of data points by local level filtering; handwriting speed is slower in a particular interval, it would likely contain more points in such interval. It follows that when the writing speed is faster, the interval would likely possess sparser distribution of the points. A conventional technique for executing such filtering procedure is called "equidistant re-sampling" procedure, which forces a minimum Euclidean distance between two data points. The results of this prior art procedure likely provides approximately equidistant data points. In the fast handwriting interval, there may be a smaller number of data points, and an interpolation technique may be used to fill the gaps between these points).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon reference to utilize the normalization means for the signature

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trace as suggested by Geiger, to duplicate handwritten data points and to suppress various noises and reduce the variability in the raw handwritten data (see paragraphs [0054], [0062]).

Hu, in the same field of endeavor, teaches extracting data relating to different parts of the normalized signature trace (see col. 4, lines 53-67; col. 5, lines 1-12; global features may include path-tangent angle of pen motion, rms speed, length-to-width ratio, etc.).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon with Geiger combination to normalization the signature trace as suggested by Hu, to "remove the effects of translation, rotation, and scale change from the signature" (see col. 5, lines 50-65) in order for matching/comparing through biometric authentication.

Regarding **claim 18**, Plamondon discloses extracting data relating to a plurality of different points of the user's signature including data relating some of said points to other points in the user's signature as inputted into the system by the manual input device (Plamondon: figures 8-11; col. 7, line 49 – col. 8, line 55).

Regarding **claim 19**, Plamondon discloses extracting data relating to a plurality of different points of the user's signature including data relating each of a number of said points to an immediately preceding point in the user's signature as inputted into the system by the manual input device (Plamondon: figures 8-11; col. 7, line 49 – col. 8, line 55).

Regarding **claim 20**, Plamondon discloses extracting data relating to a plurality of different points of the user's signature including data relating a last point to a first point in the user's signature as inputted into the system by the manual input device (Plamondon: figures 8-11; col. 7, line 49 – col. 8, line 55).

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Regarding **claim 21**, Plamondon teaches extracting angle data concerning the relative angular positions of a plurality of points of the user's signature (Plamondon: col. 7, line 49 – col. 8, line 55).

Regarding **claim 22**, Plamondon teaches extracting distance data concerning the relative distances apart of a plurality of points of the user's signature (Plamondon: figures 8-11; col. 7, line 49 – col. 8, line 55).

Regarding **claim 23**, Plamondon teaches extracting timing data indicative of the relative times between execution of different parts of the user's signature, and the comparison means is adapted to compare the extracted timing data with reference timing data in the reference data file (Plamondon: figures 8-11; col. 7, line 49 – col. 8, line 55).

Regarding **claim 31**, Plamondon discloses training to refine the verification criteria by which a match is to be judged on the basis of angle and distance data relating to a plurality of samples of the user's signature inputted into the system by the user during the registration phase and generated false samples (Plamondon: col. 20, line 59 – col. 21, lines 67; to determine the personalize threshold values more than one reference signatures are acquired, and compared among themselves taken two by two, to obtain several groups of RC1, RC2 ... to this effect the apparatus further comprises means for comparing each of said Rc1 Rc2 ... with other corresponding value of its own group, and determining maximum value of each group which constitutes respectively personalized threshold values Sp1, Sp2 ...).

Regarding **claim 32**, Plamondon discloses a reject output indicative of non-matching of one or more verification criteria only after completion of all the verification procedures (Plamondon: figure 21; col. 21, lines 28-67).

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Regarding **claims 33-37**, Plamondon discloses a method for authenticating a user's signature comprising:

extracting angle data and distance data relating to different parts of a user's signature inputted using a manual input device to obtain a signature trace (Plamondon: col. 12, lines 1-9; col. 1, lines 44-67);

setting up a reference data file comprising angle and distance data relating to a plurality of samples of the user's signature inputted during a registration phase, wherein the plurality of samples of the user's signature are based upon a time to obtain a plurality of samples (Plamondon: col. 6, lines 63-68);

comparing the angle and distance data relating to different parts of the normalized signature trace during an authentication phase to the reference angle and the reference distance data held in the reference data file,

according to defined verification criteria (Plamondon: col. 12, lines 64-68; col. 13, lines 1-15);

providing an output indicative of an appropriate match between the user's signature and the reference angle data and reference distance data in dependence on the result of the comparison, thereby providing verification of the user's signature (Plamondon: figures 1a,1b); and

training to refine the verification criteria by which a match is to be judged on the basis of angle and distance data relating to a plurality of samples of the user's signature during the registration phase and generated false samples (Plamondon: col. 20, line 59 – col. 21, lines 67; to determine the personalize threshold values more than one reference signatures are acquired, and compared among themselves taken two by two, to obtain several groups of RC1, RC2 ... to this effect the apparatus further comprises means for comparing each of said Rc1 Rc2 ... with other

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corresponding value of its own group, and determining maximum value of each group which constitutes respectively personalized threshold values  $Sp_1, Sp_2 \dots$ ). Plamondon does not disclose normalizing the signature trace to generate a plurality of temporally equidistant points on the signature trace by normalizing the signature trace to an arc length of 1 and the total time to produce the signature to 1; and extracting data relating to different parts of the normalized signature trace.

Geiger, in the same field of endeavor, teaches normalizing the signature trace to generate a plurality of temporally equidistant points on the signature trace by normalizing the signature trace to an arc length of 1 and the total time to produce the signature to 1 (see paragraphs [0020], [0054], [0080]; [0062]; respective segment is normalized to be comparable with the previously stored extensions; handwriting recognition system subjects the received coordinates to a normalization technique, such as Gaussian Smoothing process (step 220). Thereafter, in step 225 (which is substantially similar to step 130 of FIG. 2), the handwriting recognition system of the present invention can determine curvature information of each point on the stroke contour or segment of the input data using the normalized or smoothed coordinates; normalize an input feature link to form a normalized input (I) so as to have the standard cross length and the standard number N of data points by local level filtering; handwriting speed is slower in a particular interval, it would likely contain more points in such interval. It follows that when the writing speed is faster, the interval would likely possess sparser distribution of the points. A conventional technique for executing such filtering procedure is called "equidistant re-sampling" procedure, which forces a minimum Euclidean distance between two data points. The results of this prior art procedure likely provides approximately equidistant data points. In the fast

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handwriting interval, there may be a smaller number of data points, and an interpolation technique may be used to fill the gaps between these points).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon reference to utilize the normalization for the signature trace as suggested by Geiger, to duplicate handwritten data points and to suppress various noises and reduce the variability in the raw handwritten data (see paragraphs [0054], [0062]).

Hu, in the same field of endeavor, teaches extracting angle and distance data relating to different parts of the normalized signature trace (see col. 4, lines 53-67; col. 5, lines 1-12; global features may include path-tangent angle of pen motion, rms speed, length-to-width ratio, etc.).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon with Geiger to utilize the normalization means for the signature trace as suggested by Hu, to "remove the effects of translation, rotation, and scale change from the signature" (see col. 5, lines 50-65) in order for matching/comparing through biometric authentication.

Regarding **claims 38-42**, Plamondon discloses a computer-readable storage medium having computer-readable instructions stored thereon for authenticating a user's signature (see fig. 1, numeral 10, col. 10, lines 51-58; unit 10 allows the storage of the software as well as the different data associated with the system), the computer-readable instructions comprising instructions for:

extracting data relating to different parts of a user's signature inputted to obtain a signature trace (Plamondon: col. 12, lines 1-9; col. 1, lines 44-67);

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setting up a reference data file comprising reference angle data and reference distance data extracted from a plurality of samples of the user's signature inputted using a manual input device during a registration phase, wherein the plurality of samples of the user's signature are based upon a time to obtain a plurality of samples (Plamondon: col. 6, lines 63-68);

comparing the data relating to different parts of the normalized signature trace during an authentication phase to the reference angle and the reference distance data held in the reference data file, according to defined verification criteria (Plamondon: col. 12, lines 64-68; col. 13, lines 1-15);

providing an output indicative of an appropriate match between the user's signature and the reference angle data and reference distance data in dependence on the result of the comparison, thereby providing verification of the user's signature (Plamondon: figures 1a,1b);

training to refine the verification criteria by which a match is to be judged on the basis of angle and distance data relating to a plurality of samples of the user's signature during the registration phase and generated false samples (Plamondon: col. 20, line 59 – col. 21, lines 67; to determine the personalize threshold values more than one reference signatures are acquired, and compared among themselves taken two by two, to obtain several groups of RC1, RC2 ... to this effect the apparatus further comprises means for comparing each of said Rc1 Rc2 ... with other corresponding value of its own group, and determining maximum value of each group which constitutes respectively personalized threshold values Sp1, Sp2 ...).

Plamondon does not disclose normalizing the signature trace to generate a plurality of temporally equidistant points on the signature trace by normalizing the signature trace to an arc length of 1

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and the total time to produce the signature to 1; and extracting data relating to different parts of the normalized signature trace.

Geiger, in the same field of endeavor, teaches normalizing the signature trace to generate a plurality of temporally equidistant points on the signature trace by normalizing the signature trace to an arc length of 1 and the total time to produce the signature to 1 (see paragraphs [0020], [0054], [0080]; [0062]; respective segment is normalized to be comparable with the previously stored extensions; handwriting recognition system subjects the received coordinates to a normalization technique, such as Gaussian Smoothing process (step 220). Thereafter, in step 225 (which is substantially similar to step 130 of FIG. 2), the handwriting recognition system of the present invention can determine curvature information of each point on the stroke contour or segment of the input data using the normalized or smoothed coordinates; normalize an input feature link to form a normalized input (I) so as to have the standard cross length and the standard number N of data points by local level filtering; handwriting speed is slower in a particular interval, it would likely contain more points in such interval. It follows that when the writing speed is faster, the interval would likely possess sparser distribution of the points. A conventional technique for executing such filtering procedure is called "equidistant re-sampling" procedure, which forces a minimum Euclidean distance between two data points. The results of this prior art procedure likely provides approximately equidistant data points. In the fast handwriting interval, there may be a smaller number of data points, and an interpolation technique may be used to fill the gaps between these points).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon reference to utilize the normalization means for the signature

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trace as suggested by Geiger, to duplicate handwritten data points and to suppress various noises and reduce the variability in the raw handwritten data (see paragraphs [0054], [0062]).

Hu, in the same field of endeavor, teaches extracting angle and distance data relating to different parts of the normalized signature trace (see col. 4, lines 53-67; col. 5, lines 1-12; global features may include path-tangent angle of pen motion, rms speed, length-to-width ratio, etc.).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon with Geiger combination to utilize the normalization means for the signature trace as suggested by Hu, to "remove the effects of translation, rotation, and scale change from the signature" (see col. 5, lines 50-65) in order for matching/comparing through biometric authentication.

Regarding **claims 43-47**, Plamondon discloses a system for authenticating a user's signature, the system comprising:

an input apparatus, wherein the input apparatus is configured to provide an output indicative of the location of the input apparatus with respect to time when the input apparatus is manipulated (see fig. 1, numeral 2, col. 7, lines 30-44, col. 10, lines 19-27; analogue-to-digital table 2 samples according to a constant frequency the handwriting movement of a user);

a computing apparatus (see fig. 1, numeral 4), wherein the computing apparatus is configured to: extract angle data and distance data relating to different parts of a user's signature outputted by the input apparatus to obtain a signature trace (Plamondon: col. 12, lines 1-9; col. 1, lines 44-67);

a reference data file comprising reference angle data and reference distance data relating to a plurality of samples of the user's signature inputted using a manual input device during a

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registration phase, wherein the plurality of samples of the user's signature are based upon a time to obtain a plurality of samples (Plamondon: col. 6, lines 63-68);

a comparator apparatus configured to compare the data relating to different parts of the normalized signature trace during an authentication phase to reference angle and distance data held in the reference data file, according to defined verification criteria (Plamondon: col. 12, lines 64-68; col. 13, lines 1-15);

an output apparatus configured to provide an output indicative of an appropriate match between the user's signature and the reference angle data and reference distance data in dependence on the result of the comparison, thereby providing verification of the user's signature (Plamondon: figures 1a,1b); and

a trainer configured to refine the verification criteria by which a match is to be judged on the basis of angle and distance data relating to a plurality of samples of the user's signature during the registration phase and generated false samples (Plamondon: col. 20, line 59 – col. 21, lines 67; to determine the personalize threshold values more than one reference signatures are acquired, and compared among themselves taken two by two, to obtain several groups of RC1, RC2 ... to this effect the apparatus further comprises means for comparing each of said Rc1 Rc2 ... with other corresponding value of its own group, and determining maximum value of each group which constitutes respectively personalized threshold values Sp1, Sp2 ...).

Plamondon does not disclose normalizing the signature trace to generate a plurality of temporally equidistant points on the signature trace by normalizing the signature trace to an arc length of 1 and the total time to produce the signature to 1; and extract data relating to different parts of the normalized signature trace.

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Geiger, in the same field of endeavor, teaches normalizing the signature trace to generate a plurality of temporally equidistant points on the signature trace by normalizing the signature trace to an arc length of 1 and the total time to produce the signature to 1 (see paragraphs [0020], [0054], [0080]; [0062]; respective segment is normalized to be comparable with the previously stored extensions; handwriting recognition system subjects the received coordinates to a normalization technique, such as Gaussian Smoothing process (step 220). Thereafter, in step 225 (which is substantially similar to step 130 of FIG. 2), the handwriting recognition system of the present invention can determine curvature information of each point on the stroke contour or segment of the input data using the normalized or smoothed coordinates; normalize an input feature link to form a normalized input (I) so as to have the standard cross length and the standard number N of data points by local level filtering; handwriting speed is slower in a particular interval, it would likely contain more points in such interval. It follows that when the writing speed is faster, the interval would likely possess sparser distribution of the points. A conventional technique for executing such filtering procedure is called "equidistant re-sampling" procedure, which forces a minimum Euclidean distance between two data points. The results of this prior art procedure likely provides approximately equidistant data points. In the fast handwriting interval, there may be a smaller number of data points, and an interpolation technique may be used to fill the gaps between these points).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon reference to utilize the normalization means for the signature trace as suggested by Geiger, to duplicate handwritten data points and to suppress various noises and reduce the variability in the raw handwritten data (see paragraphs [0054], [0062]).

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Hu, in the same field of endeavor, teaches extract angle and distance data relating to different parts of the normalized signature trace (see col. 4, lines 53-67; col. 5, lines 1-12; global features may include path-tangent angle of pen motion, rms speed, length-to-width ratio, etc.).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon with Hu combination to utilize the normalization means for the signature trace as suggested by Hu, to "remove the effects of translation, rotation, and scale change from the signature" (see col. 5, lines 50-65) in order for matching/comparing through biometric authentication.

Regarding **claims 48, 51**, Plamondon discloses a method of verifying a user's signature, comprising:

comparing data derived from at least one vector from an input signature received from a manual input device during an authentication phase to reference angle data and reference distance data, according to defined verification criteria (Plamondon: col. 12, lines 64-68; col. 13, lines 1-15), and wherein the reference angle and distance data is obtained from a reference data file comprising data relating to a plurality of samples of the user's signature; and providing an output indicative of an appropriate match between the data derived from said at least one vector and the reference angle data and reference distance data in dependence on the result of the comparison, thereby providing verification of the user's signature (Plamondon: figures 1a,1b); training to refine the verification criteria by which a match is to be judged on the basis of data relating to a plurality of samples of the user's signature during the registration phase and generated false samples (Plamondon: col. 20, line 59 – col. 21, lines 67; to determine the personalize threshold values more than one reference signatures are acquired, and compared among themselves taken

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two by two, to obtain several groups of RC1, RC2 ... to this effect the apparatus further comprises means for comparing each of said Rc1 Rc2 ... with other corresponding value of its own group, and determining maximum value of each group which constitutes respectively personalized threshold values Sp1, Sp2 ...).

Plamondon does not disclose an arc length and total time of the signature trace are normalized to 1 to generate a plurality of temporally equidistant points on the signature trace; plurality of samples of the user's signature are based upon a time to obtain a plurality of samples; and the data derived from said at least one vector comprises data relating to different parts of a normalized signature trace.

Geiger, in the same field of endeavor, teaches an arc length and total time of the signature trace is normalized to 1 to generate a plurality of temporally equidistant points on the signature trace (see paragraphs [0020], [0054], [0080]; [0062]; respective segment is normalized to be comparable with the previously stored extensions; handwriting recognition system subjects the received coordinates to a normalization technique, such as Gaussian Smoothing process (step 220). Thereafter, in step 225 (which is substantially similar to step 130 of FIG. 2), the handwriting recognition system of the present invention can determine curvature information of each point on the stroke contour or segment of the input data using the normalized or smoothed coordinates; normalize an input feature link to form a normalized input (I) so as to have the standard cross length and the standard number N of data points by local level filtering; handwriting speed is slower in a particular interval, it would likely contain more points in such interval. It follows that when the writing speed is faster, the interval would likely possess sparser distribution of the points. A conventional technique for executing such filtering procedure is

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called "equidistant re-sampling" procedure, which forces a minimum Euclidean distance between two data points. The results of this prior art procedure likely provides approximately equidistant data points. In the fast handwriting interval, there may be a smaller number of data points, and an interpolation technique may be used to fill the gaps between these points).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon reference to utilize the normalization means for the signature trace as suggested by Geiger, to duplicate handwritten data points and to suppress various noises and reduce the variability in the raw handwritten data (see paragraphs [0054], [0062]).

Hu, in the same field of endeavor, teaches the angle and distance data comprises extracted angle and distance data relating to different parts of a normalized signature trace (see col. 3, lines 1-9, col. 4, lines 53-67; col. 5, lines 1-12; processing the raw signature data, thereby to produce smoothed and normalize signature data; global features may include path-tangent angle of pen motion, rms speed, length-to-width ratio, etc.).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon with Geiger combination to utilize the normalization means for the signature trace as suggested by Hu, to "remove the effects of translation, rotation, and scale change from the signature" (see col. 5, lines 50-65) in order for matching/comparing through biometric authentication.

Regarding **claims 55, 56**, Plamondon discloses a method of verifying a signature comprising:

receiving, from a manual input device, the signature (see fig. 1, col. 7, lines 30-44; digitizing and segmenting a handwritten movement, an analogue-to-digital tablet 2);

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extracting angle data and distance data relating to different parts of the signature to obtain a signature trace (Plamondon: col. 12, lines 1-9; col. 1, lines 44-67);

setting up a reference data file comprising reference angle data and reference distance data extracted from a plurality of samples of the user's signature inputted into the system by the user during a registration phase (Plamondon: col. 6, lines 63-68);

comparing the data relating to different parts of the normalized signature trace during an authentication phase to the reference angle data and the reference distance data held in the reference data file, according to defined verification criteria (Plamondon: col. 12, lines 64-68; col. 13, lines 1-15); and

providing an output to the user indicative of an appropriate match between user's signature and the reference angle data reference distance data in dependence on the result of the comparison (Plamondon: figures 1a,1b).

Plamondon does not disclose normalizing the signature trace to generate a plurality of temporally equidistant points on the signature trace by normalizing the signature trace to an arc length of 1 and the total time to produce the signature to 1; extracting data relating to different parts of the normalized signature trace; and linearly time warping the signature trace so that the normalized signature trace contains a pre-determined number of temporally equidistant points.

Geiger, in the same field of endeavor, teaches normalizing the signature trace to generate a plurality of temporally equidistant points on the signature trace by normalizing the signature trace to an arc length of 1 and the total time to produce the signature to 1 (see paragraphs [0020], [0054], [0080]; [0062]); linearly time warping the signature trace so that the normalized signature trace contains a pre-determined number of temporally equidistant points (see

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paragraphs [0020], [0054], [0080]; [0062]; respective segment is normalized to be comparable with the previously stored extensions; handwriting recognition system subjects the received coordinates to a normalization technique, such as Gaussian Smoothing process (step 220).

Thereafter, in step 225 (which is substantially similar to step 130 of FIG. 2), the handwriting recognition system of the present invention can determine curvature information of each point on the stroke contour or segment of the input data using the normalized or smoothed coordinates; normalize an input feature link to form a normalized input (I) so as to have the standard cross length and the standard number N of data points by local level filtering; handwriting speed is slower in a particular interval, it would likely contain more points in such interval. It follows that when the writing speed is faster, the interval would likely possess sparser distribution of the points. A conventional technique for executing such filtering procedure is called "equidistant re-sampling" procedure, which forces a minimum Euclidean distance between two data points. The results of this prior art procedure likely provides approximately equidistant data points. In the fast handwriting interval, there may be a smaller number of data points, and an interpolation technique may be used to fill the gaps between these points).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon reference to utilize the normalization means and equidistance points for the signature trace as suggested by Geiger, to duplicate handwritten data points and to suppress various noises and reduce the variability in the raw handwritten data (see paragraphs [0054], [0062]).

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Hu, in the same field of endeavor, teaches extracting angle and distance data relating to different parts of the normalized signature trace (see col. 4, lines 53-67; col. 5, lines 1-12; global features may include path-tangent angle of pen motion, rms speed, length-to-width ratio, etc.).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon with Geiger combination to utilize the normalization means for the signature trace as suggested by Hu, to "remove the effects of translation, rotation, and scale change from the signature" (see col. 5, lines 50-65) in order for matching/comparing through biometric authentication.

Regarding **claim 57**, Plamondon discloses at least one vector to derive the angel data and distance data (col. 12, lines 1-9; col. 1, lines 44-67).

7. **Claims 8-11, 24-27, 52-54** are rejected under 35 U.S.C. 103(a) as being unpatentable over by Plamondon (US 5,101,437), Geiger et al (US 2006/0050962 A1) with Hu et al (US 6,157,731), and further in view of Young et al (US 4,805,222).

Regarding **claims 8-11**, Plamondon, Geiger with Hu combination discloses all elements as mentioned above in claim 1. Plamondon, Geiger with Hu combination does not teach a password verification means that is provided for verifying input of a required password, as determined by reference password means, by the user using a keyboard input device; timing verification means that is provided for verifying input of the password by the user with the required timing, as determined by reference timing means, using the keyboard input device; and verifying a plurality of hold times for which the relevant keys of the keyboard input device are depressed during input of the password, and means for verifying a plurality of

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latency times between a release of one key and a depression of a following key during use of the keyboard input device to enter the password.

Young teaches a password verification means that is provided for verifying input of a required password, as determined by reference password means, by the user using a keyboard input device (Young: col. 2, lines 40-52); timing verification means that is provided for verifying input of the password by the user with the required timing, as determined by reference timing means, using the keyboard input device (Young: col. 6, lines 50-63); verifying a plurality of hold times for which the relevant keys of the keyboard input device are depressed during input of the password, and means for verifying a plurality of latency times between a release of one key and a depression of a following key during use of the keyboard input device to enter the password (Young : col. 7, lines 6-21); and user name input means is provided for receiving a user name inputted into the system to identify the identity of the user for the purposes of selection of the required reference data file for that user (Young: figure 10).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon, Geiger with Hu combination reference to utilize timing password verification and username as suggested by Young, to increase the dynamics and functionality of the authentication system since an individual's typing pattern tends to be as unique as another biometric feature which allow hierarchies of security to be defined (see col. 1, lines 34-67).

Regarding **claims 24-27**, Plamondon, Geiger with Hu combination discloses all elements as mentioned above in claim 17. Plamondon, Geiger with Hu combination does not disclose verifying an input of a required password, as determined by reference password, by the user

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using a keyboard input device; verifying the input of the password by the user with a required timing, as determined by a reference timing, using the keyboard input device; verifying a plurality of hold times for which the relevant keys of the keyboard input device are depressed during input of the password; and verifying a plurality of latency times between the release of one key and the depression of the following key during use of the keyboard input device to enter the password; and receiving a user name inputted into the system to identify the identity of the user for the purposes of selection of the required reference data file for that user.

Young, in the same field of endeavor, teaches verifying an input of a required password, as determined by reference password, by the user using a keyboard input device (Young: col. 2, lines 40-52); verifying the input of the password by the user with a required timing, as determined by a reference timing, using the keyboard input device (Young: col. 6, lines 50-63); verifying a plurality of hold times for which the relevant keys of the keyboard input device are depressed during input of the password; and verifying a plurality of latency times between the release of one key and the depression of the following key during use of the keyboard input device to enter the password (Young : col. 7, lines 6-21); and receiving a user name inputted into the system to identify the identity of the user for the purposes of selection of the required reference data file for that user (Young: figure 10).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon, Geiger with Hu combination reference to utilize timing password verification and username as suggested by Young, to increase the dynamics and functionality of the authentication system since an individual's typing pattern tends to be as

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unique as another biometric feature which allow hierarchies of security to be defined (see col. 1, lines 34-67).

Regarding **claims 52-54**, Plamondon, Geiger with Hu combination discloses all elements as mentioned above in claim 48. Plamondon, Geiger with Hu combination does not disclose verifying an input of a required password, as determined by reference password, by the user using a keyboard input device; verifying the input of the password by the user with a required timing, as determined by a reference timing, using the keyboard input device; verifying a plurality of hold times for which the relevant keys of the keyboard input device are depressed during input of the password; and verifying a plurality of latency times between the release of one key and the depression of the following key during use of the keyboard input device to enter the password.

Young, in the same field of endeavor, teaches verifying an input of a required password, as determined by reference password, by the user using a keyboard input device (Young: col. 2, lines 40-52); verifying the input of the password by the user with a required timing, as determined by a reference timing, using the keyboard input device (Young: col. 6, lines 50-63); verifying a plurality of hold times for which the relevant keys of the keyboard input device are depressed during input of the password; and verifying a plurality of latency times between the release of one key and the depression of the following key during use of the keyboard input device to enter the password (Young : col. 7, lines 6-21).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon, Geiger with Hu combination reference to utilize timing password verification and username as suggested by Young, to increase the dynamics and

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functionality of the authentication system since an individual's typing pattern tends to be as unique as another biometric feature which allow hierarchies of security to be defined (see col. 1, lines 34-67).

8. **Claims 12, 28** are rejected under 35 U.S.C. 103(a) as being unpatentable over by Plamondon (US 5,101,437), Geiger et al (US 2006/0050962 A1) with Hu et al (US 6,157,731), and further in view of Obata (US 5,553,156).

Regarding **claim 12**, Plamondon, Geiger with Hu combination discloses all elements as mentioned above in claim 1. Plamondon, Geiger with Hu combination does not teach at least one neural network for determining the verification criteria by which a match is to be judged by providing a comparison output to the verification means.

Obata teaches at least one neural network for determining the verification criteria by which a match is to be judged by providing a comparison output to the verification means (see col. 1, lines 6-16; signature recognition apparatus which is based on the utilization of the learning and recognizing functions of a neural net (network) and, more particularly, to a signature recognition apparatus which is designed to produce a positive sample (true signature) and a negative sample (false signature) according to the characteristics of a hand-written signature and perform learning of the neural net based on the positive and negative samples thus provided).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon, Geiger with Hu combination reference to utilize a neural network as suggested by Obata, in order to ensure more accurate recognition by reducing the time needed for the learning period (see col. 3, lines 20-45).

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Regarding **claim 28**, Plamondon, Geiger with Hu combination discloses all elements as mentioned above in claim 17. Plamondon, Geiger with Hu combination does not teach at least one neural network for determining the verification criteria by which a match is to be judged by providing a comparison output to the verification means.

Obata teaches at least one neural network for determining the verification criteria by which a match is to be judged by providing a comparison output to the verification means (see col. 1, lines 6-16; signature recognition apparatus which is based on the utilization of the learning and recognizing functions of a neural net (network) and, more particularly, to a signature recognition apparatus which is designed to produce a positive sample (true signature) and a negative sample (false signature) according to the characteristics of a hand-written signature and perform learning of the neural net based on the positive and negative samples thus provided).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon, Geiger with Hu combination reference to utilize a neural network as suggested by Obata, in order to ensure more accurate recognition by reducing the time needed for the learning period (see col. 3, lines 20-45).

9. **Claims 13, 14, 29, 30, 49, 50** are rejected under 35 U.S.C. 103(a) as being unpatentable over by Plamondon (US 5,101,437), Geiger et al (US 2006/0050962 A1) with Hu et al (US 6,157,731), and further in view of Collot et al (US 5,042,073).

Regarding **claims 13 and 14**, Plamondon, Geiger with Hu combination discloses all elements as mentioned above in claim 1. Plamondon, Geiger with Hu combination does not teach different features of the user's signature selected according to the fitness of such features to

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discriminate the user's signature for the purposes of verification and determined by a fitness function relating the relative fitness of the features to their form and number; and an optimization algorithm, such as a genetic algorithm.

Collot teaches different features of the user's signature selected according to the fitness of such features to discriminate the user's signature for the purposes of verification and determined by a fitness function relating the relative fitness of the features to their form and number (Collot: col. 1, lines 67-68 – col. 2, lines 1-11); and a optimization algorithm, such as a genetic algorithm (Collot: col. 1, lines 67-68 – col. 2, lines 1-11).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon, Geiger with Hu combination reference to utilize a fitness/optimization function as suggested by Collot, to increase the reliability of the system by “minimiz[ing] decision errors” (Collot: col. 2, lines 5-11).

Regarding **claims 29, 30**, Plamondon, Geiger with Hu combination discloses all elements as mentioned above in claim 17. Plamondon, Geiger with Hu combination does not teach different features of the user's signature selected according to the fitness of such features to discriminate the user's signature for the purposes of verification and determined by a fitness function relating the relative fitness of the features to their form and number; and an optimization algorithm, such as genetic algorithm.

Collot teaches different features of the user's signature selected according to the fitness of such features to discriminate the user's signature for the purposes of verification and determined by a fitness function relating the relative fitness of the features to their form and number (Collot:

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col. 1, lines 67-68 – col. 2, lines 1-11); and a optimization algorithm, such as genetic algorithm (Collot: col. 1, lines 67-68 – col. 2, lines 1-11).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon, Geiger with Hu combination reference to utilize a fitness/optimization function as suggested by Collot, to increase the reliability of the system by “minimiz[ing] decision errors” (Collot: col. 2, lines 5-11).

Regarding **claims 49, 50**, Plamondon, Geiger with Hu combination discloses all elements as mentioned above in claim 48. Plamondon, Geiger with Hu combination does not teach different features of the user's signature selected according to the fitness of such features to discriminate the user's signature for the purposes of verification and determined by a fitness function relating the relative fitness of the features to their form and number; and an optimization algorithm, such as a genetic algorithm.

Collot teaches different features of the user's signature selected according to the fitness of such features to discriminate the user's signature for the purposes of verification and determined by a fitness function relating the relative fitness of the features to their form and number (Collot: col. 1, lines 67-68 – col. 2, lines 1-11); and a optimization algorithm, such as a genetic algorithm (Collot: col. 1, lines 67-68 – col. 2, lines 1-11).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Plamondon, Geiger with Hu combination reference to utilize a fitness/optimization function as suggested by Collot, to increase the reliability of the system by “minimiz[ing] decision errors” (Collot: col. 2, lines 5-11).

***Conclusion***

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EDWARD PARK whose telephone number is (571)270-1576. The examiner can normally be reached on M-F 10:30 - 20:00, (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samir Ahmed can be reached on (571) 272-7413. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Edward Park  
Examiner  
Art Unit 2624

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